

LARVAL DESCRIPTION AND TRANSFER OF THAUMAPHRASTUS KARANISENSIS FROM COLYDIIDAE TO A NEW SUBFAMILY OF DERMESTIDAE (COLEOPTERA)

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This interesting blind, wingless beetle was described by Blaisdell (1927) from a single incomplete and broken specimen that was removed from a plant gall. The gall had been buried for approximately 1700 years in the ruins of Karenis, a Greco-Roman town near the present-day Kom Washim, Fayoum Province, Egypt. Dr. Blaisdell realized that the species was an anomalous one. He did not assign it to any family, partly because the posterior tarsi were missing. However, he indicated that there might be some similarities, although only superficial ones, to *Aglenus*, in the Colydiidae. The beetle was catalogued in that family in the Zoological Record for 1927 (Insecta, p. 177). Except for being listed "Incertae sedis" in the Colydiidae by Hetschko (1930) no further references to the species in literature can be found under the name *Thaumaphrastus*.

In 1937 living specimens of the species were collected in a rice mill at Bay City, Tex., by A. I. Balzer, who was investigating insect pests of stored grains for the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture. The specimens were identified by H. S. Barber and W. S. Fisher, of that Bureau, by comparison with the fragments of the female type upon which the original description was based. Barber and Fisher informed Balzer of the importance of his discovery and urged him to collect further specimens and obtain immature stages if possible. Mr. Balzer kindly bred the species on a mixture of corn, wheat, and rice flour to which commercial meat scrap had been added. Subsequently he sent numerous adults and two larvae, which have been placed in the collections of the U. S. National Museum.

As indicated above, the incompleteness of the original specimen prevented Blaisdell from making a positive assignment of the species to any family, and he assigned it to the Clavicornia rather than to the Serricornia only with some evident hesitation. As is sometimes the case in difficulties of this nature, however, the characteristics of the larva, or at least the relative importance assigned to them, indicate clear-cut affinities with an established group of Coleoptera. In this case there seems to be no doubt that the larva is related to the larvae of the Dermestidae, particularly

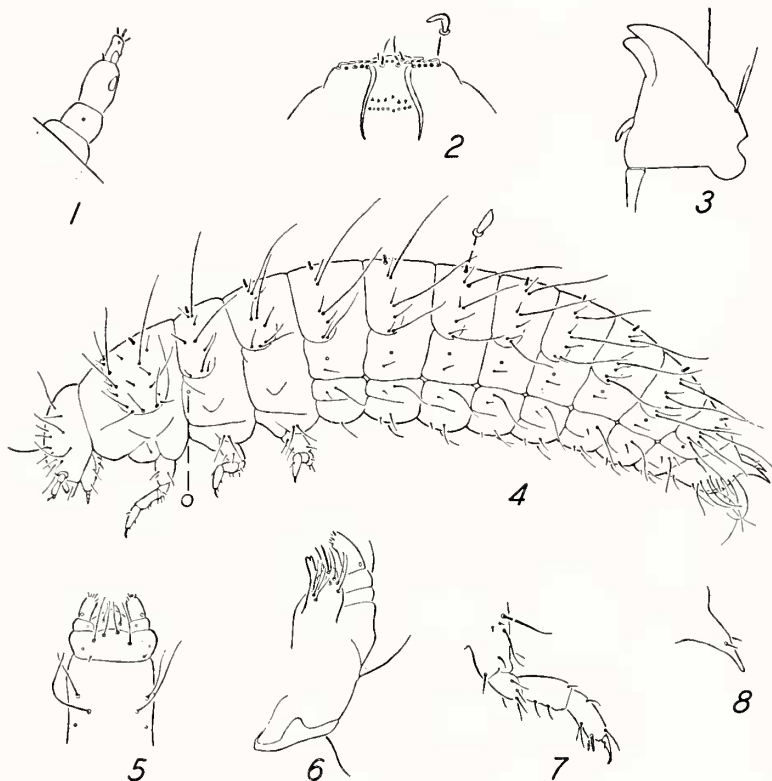
of the genus *Dermestes*.

This paper has been prepared to point out these similarities, as well as the differences between larvae of the Dermestidae and the larva of *Thaumaphrastus*. It seems advisable at the same time to include drawings of the adult beetle and certain details of its structure, together with some remarks on the bearing of these details on the proper placement of the species. The figures published by Blaisdell were of necessity drawn from fragments, and therefore may not give more than a general idea of the appearance of the perfect insect. By including the drawing of the adult it is hoped to make the species more readily recognizable. Possibly the species should be known under some prior name, catalogued in some other family.

Although described from Egypt, the species has a wide distribution and very likely is cosmopolitan. It may be carried in commerce. In addition to specimens from Bay City and Beaumont, Tex., where the rearing was done, there are specimens in the collections of the U. S. National Museum from Lincoln County, Nebr., found in a peach orchard; from Mexico (without further locality) associated with rice; and from India, intercepted with sweet potatoes in quarantine at New York City. If occurrence in flour mills may be included in the habits of the species, one may expect it to be abundant at times. Its apparent scarcity in collections could be explained by both the small size and the probable confinement to dark, secluded places.

The principal characteristics by which the larva of *Thaumaphrastus* is to be recognized are as follows:

Body (fig. 4) with simple setae, i.e., not spinulate or hastate, one pair near middorsal line on each thoracic segment and abdominal segments I to VIII short, clubbed; head free; epicranial and frontal sutures present; antenna (fig. 1) consisting of three articles, the penultimate article with apical, subconical, accessory sensory appendage; labrum free, its anterior margin slightly produced in the middle; epipharynx (fig. 2) with a short series of sharply curved setae on anterolateral margin; epipharynx, near middle, with a transverse series of about six minute setae and immediately behind these a transverse row of minute sensory pores; labral rods moderately long, in the shape of a sigmoid curve; mandible (fig. 3) with two apical teeth, with slender retinaculum, without basal tuft of setae; maxillary palpus (fig. 6) consisting of three articles; lacinia with an elongate, curved, apically bifid spur; maxillary articulating areas not large and cushioned; labial palpus



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### EXPLANATION OF PLATE X

*Thaumaphrastus karanisensis* Blaisdell—larva. (Figures drawn by author.) Fig. 1, Antenna. Fig. 2, Epipharynx. Fig. 3, Mandible. Fig. 4, Larva. Fig. 5, Labium. Fig. 6, Maxilla. Fig. 7, Leg. Fig. 8, Urogomphus.

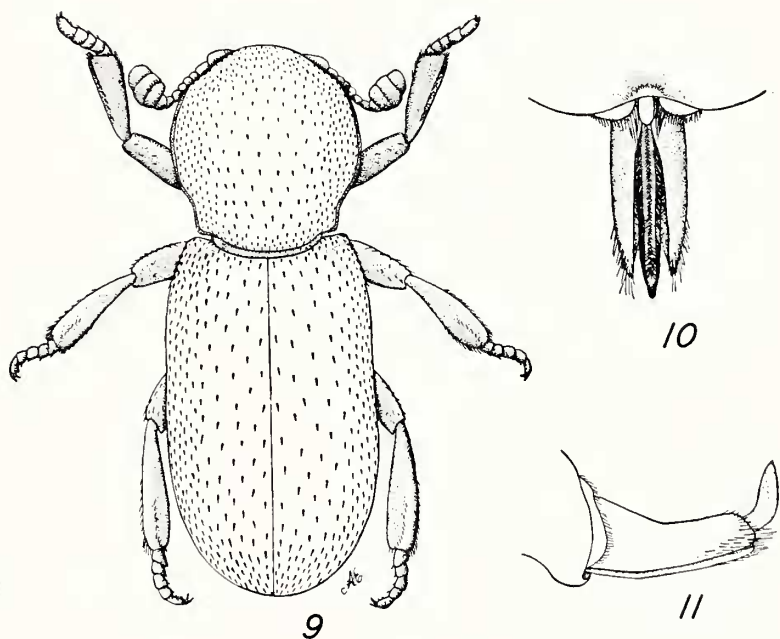
(fig. 5) consisting of two articles; gula present; legs (fig. 7) consisting of five articles, the tarsus and claw fused into a single claw-shaped, tarsungulus; spiracles simple, subcircular; abdominal segment X short, membranous, consisting mostly of lobes around anus; urogomphi (fig. 8) present, solid, slightly decurved.

Length of larger larva studied: 2.0 mm.

As stated previously, the larva of *Thaumaphrastus* bears many resemblances to larvae of the Dermestidae. A comparison of the diagnosis given above with that published by Rees (1943) for the dermestids will show this to be the case. The similarities which seem to be most significant, because they are diagnostic for dermestid larvae, are found in the general configuration of epipharynx and the bifid spur on lacinia. There is at least a vague similarity between *Thaumaphrastus* and *Dermestes* in the arrangement of the setae on the abdominal tergites. Rees (1947) states that *Dermestes* larvae have eight distinct oblique rows of setae on each abdominal tergite, i.e., four rows on each side of the middorsal line. Although there are no distinct rows of setae on the tergites of *Thaumaphrastus*, the setae tend to be in four groups on each side of the middorsal line.

The larva of *Thaumaphrastus* differs from larvae of the Dermestidae, as characterized by Rees, in the following features: setae on body simple, setae on anterolateral margin of epipharynx not broader toward the middle line, and labral rods curved toward each other posteriorly. Of these characteristics the difference in the shape of the setae on the body appears to be the most significant. However, it should be pointed out that Rees did not know the larva of *Orphilus*, which according to the description and figures published by Paulian (1943) has only simple setae. If *Orphilus* is correctly placed in the Dermestidae, the importance of the shape of the setae as a diagnostic character is lessened. We are left, then, with no characters that prohibit the inclusion of *Thaumaphrastus* in the Dermestidae.

Since the larva of *Thaumaphrastus* shows such strong affinities with larvae of the Dermestidae, particularly *Dermestes*, it will be appropriate to compare, briefly, the characters of the adults. It is not the purpose of the present discussion to make an exhaustive comparative study, but rather to point out the more obvious similarities and dissimilarities. At first glance the adults of *Thaumaphrastus* (fig. 9) do not appear to bear even a superficial resemblance to those of the Dermestidae. The adults of the latter, as characterized by Hinton (1945) are usually compact and



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### EXPLANATION OF PLATE XI

*Thaumaphrastus karanisensis* Blaisdell—adult. (Figures drawn by Miss Addie M. Egbert.) Fig. 10, Dorsal view. Fig. 11, Aedeagus, ventral view. Fig. 12, Aedeagus, lateral view.

strongly convex beetles, nearly always with a dense vestiture of hairs or scales. The legs can be more or less completely retracted, and the hind coxae are somewhat transverse and excavated for the reception of the femora. Adults of *Thaumaphrastus* are not compact, and only weakly convex, with a rather sparse, fine hairlike vestiture. The legs cannot be effectively retracted, and the hind coxae are not transverse and not excavated to receive the femora. Eyes are absent, as are also the hind wings, the latter being present in all known dermestids except in females of the degenerate *Thylo-drias*. However, adults of *Thaumaphrastus* possess the following characters found in at least some dermestids: head somewhat deflexed; antenna consisting of eleven articles, the last three of which form an abrupt, compact club; maxillary palpus consisting of three articles; inflexed ventral sides of pronotum with an oval impression for the reception of the antennal club; elytra entire; five visible abdominal sternites; front coxae contiguous, the coxae cavities open behind; hind femora with a readily discernible, but shallow, ventral groove for the partial reception of the tibiae; all tarsi consisting of five articles, the tarsal claws simple. In addition to the above-mentioned characteristics, the structure of the male aedeagus should be noted. The aedeagus (figs. 10, 11) is typically dermestoid, being practically identical in basic structure with that of some species of *Dermestes*, with well-developed, subparallel, lateral lobes and the median lobe strongly hook-shaped terminally, the hook directed dorsad, the orifice ventral and subterminal.

Although the lack of eyes and of hind wings are striking characteristics, neither can be considered as being of much significance beyond indicating a state of degeneracy. In widespread groups of Coleoptera either or both of these evidences of degeneracy have been accepted as being of no particular taxonomic significance. It appears, then, that the most tangible differences between *Thaumaphrastus* and the dermestids are found in the general habitus, in the correlated condition in which the legs are elongate and can not be retracted effectively, and in the vestiture. Because of my faith in the importance of larval structure and the preponderance of other characters, principally the structure of the male genitalia, held in common by adults of *Thaumaphrastus* and *Dermestes*, I am inclined to dismiss the observed differences in vestiture and habitus with the accompanying adaptations as being of no great consequence, and to conclude that the species is related to the Dermestidae, particularly to *Dermestes*. How close a relationship shall be indicated is, of course, a matter of individual opinion. The

dermestids form a group which is readily definable on larval characters of the adults as well. The inclusion of *Thaumaphrastus* in the family would not impose difficulties in characterization on larval structures, especially if *Orphilus* were continued in the *Dermestidae*. From the standpoint of the adults, the inclusion of *Thaumaphrastus* would present no more difficulties than does the inclusion of *Thylodrias*. It seems quite permissible, therefore, to consider *Thaumaphrastus* as belonging in the *Dermestidae*.

In the belief that a subfamily should be a more homogeneous group than is essential for a family, it would be desirable not to include *Thaumaphrastus* in the Dermestinae but to consider it as constituting a separate subfamily. The erection of a new subfamily of the Dermestidae, the Thaumaphrastinae, therefore, is proposed to include the single species *Thaumaphrastus karanisensis* Blaisdell. The new subfamily is considered to be most closely related to the Dermestinae, being separated from the latter by the vestiture, the structure of hind coxae, the lack of eyes and hind wings as imaginal characters, and the simple setae and the absence of a basal brush of setae on mandible as larval characters.

## LITERATURE CITED

- Blaisdell, Frank E., Sr., 1927. A blind beetle excavated from an Egyptian city's ruins dating between 117 and 235 A. D. Proc. Ent. Soc. Wash. 29: 121-125, illus.
- Hetschko, A., 1930. Coleopterorum Catalogus, Junk, Pars 107, Colydiidae, p. 107.
- Hinton, H. E., 1945. A monograph of the beetles associated with stored products, Vol. I. (Dermestidae: pp. 234-401, illus.) Norwich, England.
- Paulian, Renaud, 1943 (1942). The larvae of the subfamily Orphilinae and their bearing on the systematic status of the family Dermestidae (Col.). Ann. Ent. Soc. Amer. 35: 393-396, illus.
- Rees, Bryant E., 1943. Classification of the Dermestidae (larder, hide, and carpet beetles) based on larval characters, with a key to the North American genera. U. S. Dept. Agr. Misc. Pub. 511, 18 pp., illus.
- , 1947. Taxonomy of the larvae of some North American species of the genus *Dermestes* (Coleoptera: Dermestidae). Proc. Ent. Soc. Wash. 49: 1-14, illus.